UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/074,799	02/13/2002	Li-Jie Jin	10007861-1	7145

7590   07/27/2005

HEWLETT-PACKARD COMPANY
Intellectual Property Administration
P.O. Box 272400
Fort Collins, CO 80527-2400

EXAMINER
ALI, SYED J

ART UNIT	PAPER NUMBER
2195	

DATE MAILED: 07/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	10/074,799	JIN ET AL.
	Examiner	Art Unit	
	Syed J. Ali	2195	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on _13 February 2002_.

2a) ☐ This action is **FINAL**.　　2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1-21_ is/are pending in the application.

　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) _1-21_ is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on _13 February 2002_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a)☐ All　b)☐ Some * c)☐ None of:

　　　1.☐ Certified copies of the priority documents have been received.

　　　2.☐ Certified copies of the priority documents have been received in Application No. _____.

　　　3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　　* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
　　Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
　　Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

1.   Claims 1-21 are pending in this application.

Claim Rejections - 35 USC § 112

2.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3.   **Claims 18-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

4.   Claims 18-19 recite the limitations "T1" and "T2". There is insufficient antecedent basis for these limitations in the claims. It is hereby assumed that Applicant intended claims 18-19 to depend from claim 17.

Claim Rejections - 35 USC § 102

5.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6.   **Claims 1-2, 5-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Ferguson et al. (USPN 5,504,894) (hereinafter Ferguson).**

7.   As per claim 1, Ferguson teaches the invention as claimed, including a method of

distributing workload in a workflow management system comprising the steps of:

        a)   calculating a load index for each engine of the workflow management system,

        wherein each load index reflects a workload of its associated engine, wherein the load

        index corresponds to an average activity execution delay (col. 3 lines 7-18; col. 5 line 66

        - col. 6 line 2); and

        b)   distributing workload across the plurality of engines in a load sensitive mode (col.

        3 lines 19-28; col. 5 lines 38-43).

8.   As per claim 2, Ferguson teaches the invention as claimed, including the method of claim

1, further comprising the steps of:

        c)   executing a test process to identify load index parameters including a single

        engine nominal activity execution delay (C) when no concurrent activities are executing

        (col. 10 lines 41-55) and an activity execution latency factor (λ), wherein λ is a function

        of a number of concurrently executing activities (col. 5 lines 54-56; col. 11 line 34 - col.

        12 line 14).

9.   As per claim 5, Ferguson teaches the invention as claimed, including the method of claim

1 wherein step b) further comprises the step of re-directing the incoming process requests to

another engine (col. 3 lines 19-28; col. 5 lines 38-43).

10.   As per claim 6, Ferguson teaches the invention as claimed, including the method of claim

1 wherein step b) further comprises the step of re-distributing.queued processes to another engine

(col. 5 lines 43-47; col. 8 line 47 - col. 9 line 5).

11.   As per claim 7, Ferguson teaches the invention as claimed, including the method of claim

1 wherein step b) further comprises the step of prioritizing a source engine for distributing

workload from based on a maximum differential workload (col. 5 lines 43-47).

12.   As per claim 8, Ferguson teaches the invention as claimed, including the method of claim

1 wherein step b) further comprises the step of identifying a target engine for distributing

workload to based on a maximum differential workload (col. 5 lines 38-43).

Claim Rejections - 35 USC § 103

13.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

14.   **Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over**

Ferguson.

15.   As per claims 3-4, Ferguson teaches the invention as claimed, including the method of claim 2, wherein step a) further comprises the step of calculating the load index for each engine j as a total average activity execution delay $L(j) = C + \Sigma\ N_i\ \lambda_i$, or a relative average activity execution delay $L(j) = \Sigma\ N_i\ \lambda_i$, wherein N_i is the number of other concurrently executing processes at the time activity i is executing, wherein λ_i is an execution latency rate for activity i (col. 5 lines 54-56; col. 11 line 34 - col. 12 line 14).

16.   It is noted that the load index calculated by Ferguson does not divide the load index by a value, k, wherein k is a total number of activities completed within a pre-determined time period for engine j. The essential role that dividing the index by k achieves is obtaining an average value for the sum obtained by $\Sigma\ N_i\ \lambda_i$. The summation is an iterative value obtained by accounting for each activity that may complete during a pre-determined time period. While Ferguson does not obtain an average in the same manner, it would have been an obvious modification of Ferguson to do so, as Ferguson discusses obtaining a weighted average to account for the summation (col. 12 lines 10-14).

17.   **Claims 9-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ferguson in view of Priem (US 2005/0091657).**

18.   As per claim 9, Ferguson teaches the invention as claimed, including a method of distributing workload in a workflow management system comprising the steps of:

    a)   calculating a load index for each engine of the workflow management system, wherein each load index reflects a workload of its associated engine (col. 3 lines 7-18; col. 5 line 66 - col. 6 line 2).

19.   Priem teaches the invention as claimed, including the workflow management system further comprising:

    b)   operating in a load insensitive workload distribution mode for distributing processes until a maximum differential load index exceeds a pre-determined threshold (paragraph 0105); and

    c)   operating in a load sensitive workload distribution mode for distributing processes until all processes have completed execution once the maximum differential load index exceeds the pre-determined threshold (paragraphs 0112, 0018).

20.   It would have been obvious to one of ordinary skill in the art to combine Ferguson and Priem since an overloaded system can lead to significant degradation in performance. Utilizing distinct modes of operation for normal conditions and overloaded conditions allows the load balancer to take optimal action. In a normal mode, the load balancing process may have minimal impact on performance, even improving performance by creating a more balanced load. However, if the system is overloaded, starting a load balancing process may actually worsen the efficiency of the system. By behaving differently in an overload condition, the system can alleviate the overload, while also redistributing processes to improve throughput.

21.   As per claim 10, Ferguson teaches the invention as claimed, including the method of

claim 9 wherein processes are round-robin distributed in the load insensitive workload

distribution mode (col. 8 lines 12-18).

22.   As per claims 11-12, and 20-21, Ferguson teaches the invention as claimed, including the

method of claims 9 and 17, wherein step a) further comprises the step of calculating the load

index for each engine j as a total average activity execution delay $L(j) = C + \Sigma\, N_i\, \lambda_i$, or a relative

average activity execution delay $L(j) = \Sigma\, N_i\, \lambda_i$, wherein N_i is the number of other concurrently

executing processes at the time activity i is executing, wherein λ_i is an execution latency rate for

activity i (col. 5 lines 54-56; col. 11 line 34 - col. 12 line 14).

23.   It is noted that the load index calculated by Ferguson does not divide the load index by a

value, k, wherein k is a total number of activities completed within a pre-determined time period

for engine j. However, these discrepancies are discussed above in reference to paragraph 16.

24.   As per claim 13, Ferguson teaches the invention as claimed, including the method of

claim 9 wherein step c) further comprises the step of re-directing incoming process requests to

another engine (col. 3 lines 19-28; col. 5 lines 38-43).

25.   As per claim 14, Ferguson teaches the invention as claimed, including the method of

claim 9 wherein step c) further comprises the step of re-distributing queued processes to another

engine (col. 5 lines 43-47; col. 8 line 47 - col. 9 line 5).

26.   As per claim 15, Ferguson teaches the invention as claimed, including the method of claim 9 wherein step c) further comprises the step of prioritizing a source engine for distributing workload from based on a maximum differential workload (col. 5 lines 43-47).

27.   As per claim 16, Ferguson teaches the invention as claimed, including the method of claim 9 wherein step c) further comprises the step of identifying a target engine for distributing workload to based on a maximum differential workload (col. 5 lines 38-43).

28.   As per claim 17, Ferguson teaches the invention as claimed, including a method of distributing workload in a workflow management system (col. 3 lines 19-28; col. 5 lines 38-43).

29.   Priem teaches the invention as claimed, including the workflow management system further comprising the steps of:

    a)   switching from a load insensitive mode to a load sensitive workload distribution mode for distributing processes when a maximum differential load index exceeds a first pre-determined threshold, T1 (paragraph 0169); and

    b)   switching from the load sensitive mode to the load insensitive workload distribution mode for distributing processes when the maximum differential load index is less than a second pre-determined threshold, T2 (paragraph 0169).

30.   As per claim 18, Priem teaches the invention as claimed, including the method of claim 17 wherein T1 = T2 (paragraph 0169).

31.   As per claim 19, Priem does not specifically teach the invention as claimed, including the method of claim 17 wherein T1 > T2. However, it would have been obvious to one of ordinary skill in the art to have a second threshold lower than the threshold that triggers the overload condition since a lower "normal" threshold allows the system to build in a level of slack before returning to normal operation mode. By having the "normal" threshold be the same as the "overload" threshold, there exists a significant possibility of the system making many shifts from normal to overload mode, further degrading performance. By allowing for slack, such back and forth triggering of the overload mode can be avoided.

Conclusion

32.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Syed J. Ali whose telephone number is (571) 272-3769. The examiner can normally be reached on Mon-Fri 8-5:30, 2nd Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai T. An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Syed Ali
July 20, 2005

MAJID BANANKHAH
PRIMARY EXAMINER